the light emitted by the lime, but that none of the rays are entirely wanting. No black lines crossing the spectrum could be observed. He explains the cause of the peculiar coloured shadows thrown by this light, as compared with those of oil and day-light; and adds, that it is remarkable that the spectrum thus emitted by incandescent quicklime differs from that of the salts of lime, the characteristic colour in the latter case being thick red.

## *On the Production and Formation of Pearls. By Sir* Everard Home, *Bart. V.P.R.S.* Read May 11, 1826. [*Phil. Trans.* 1826, *p.* 338.]

In his examinations of the organs of generation of the large fresh-water muscle, the author often met with seed pearls, either in the ovarium, or connected with the shell upon which the ovarium lay; and he remarked at the same time that all Oriental pearls have a brilliant central cell, which in the common mode of boring them is destroyed, but which may be beautifully exhibited by carefully splitting the pearl into halves: this cell is just large enough to contain an ovum, which is formed upon a pedicle like the yolk of the pullet's egg, and is similarly discharged when completely formed. Thence Sir Everard concludes, that a pearl is formed upon the external surface of an ovum, which having been blighted, does not pass with the others into the oviduct, but remains attached to its pedicle in the ovarium, and in the following season receives a coat of pearl at the same time that the inner surface of the shell receives its annual supply. This conclusion, he observes, is verified by some pearls being spherical while others are pyramidal, in consequence of the pedicle, as well as the ovum, having been enamelled with nacre.

This paper concludes with an extract from one of the early volumes of the Philosophical Transactions, in which a corresponding account of the growth of pearls is announced by Arnoldi in 1673.

## *On Burrowing and Boring Marine Animals. By* Edward Osler, *Esq. Communicated February* 15, 1826, *by* L. W. Dillwyn, *Esq. F.R.S.* Read May 25, 1826. [*Phil. Trans.* 1826, *p.* 342.]

The author's object in this paper is to describe the mechanism by which the boring and burrowing shell-fish form their habitations, and to explain some parts respecting the burrowing of other marine animals.

After showing that the Nereides bury themselves by the undulating motion which they employ in swimming, aided by the action of their bristly feet, and that the *Arenicola piscatorum* forms its imperfect arenaceous tube by the aid of a viscid secretion which exudes from the anterior half of the animal, he particularly describes the habits of the *Terebella conchilega*, showing that by a glutinous secretion it cements together particles of shells and sand, so as to form a collar, which is regularly and curiously lengthened into a tube; and when this is about an inch in length the animal proceeds to

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burrow; and having completely concealed itself, is soon found to have turned within the tube. Mr. Osler describes the manner in which this motion is effected by reference to an annexed drawing.

The Spatangus buries itself chiefly by the action of its bristles, while the long dorsal spines prevent the sand from closing entirely, and preserve a small round hole, by which water is admitted to the animal, and which marks its situation.

The author next describes the burrowing of bivalves. The animal projects the foot into the sand, and then gives a circular motion to the shell, sinking at every stroke till nothing but the extremity of the syphon can be perceived above the sand. This motion is effected by two appropriate pairs of muscles arising from the shell, and inserted into the foot, the position and actions of which are explained by reference to a drawing. The locomotive bivalves travel by a series of motions similar to those of burrowing, as seen in the *Venus gallina*, the *Anodonta cygnæa*, &c. The *Buccinum undatum*, though not habitually residing under the sand, is so often observed to bury itself as to come within the author's arrangement: as in the bivalves, its foot is the instrument of penetration, and, like them, it can distend that organ to nearly the size of the shell; the author describes its anatomy by the help of annexed drawings. He also enters into a detailed account of the peculiarities of structure of the Pholas, which has two methods of boring. The first is almost exclusively employed by the young animal; it fixes itself by the foot, and having raised itself almost perpendicularly, executes a succession of rotatory motions; but when the animal is older, the foot being attached as before, it brings the anterior points of the shell so as to press its operative part against the bottom of the hole, and then the dorsal margins of the valves are brought into contact, so that the rasp-like portions scrape over the substance on which they press. In the Teredo, the peculiarities of structure observed in the Pholas exist in an equally marked degree.

Mr. Osler next describes four species of Lithophagi, of which the *Saxicava rugosa* is so abundant at Swansea, as to induce him to take it as the type of the family. Its general structure resembles that of the burrowing bivalves, but it does not admit of boring by any rotatory motion; and several other facts show that the shell is not the instrument by which it penetrates hard substances, such, for instance, as the absence of any arrangement of muscles for the purpose, and it being able to penetrate certain substances only, all of which are of a calcareous nature. Hence the author concludes, that the perforating power of the Lithophagi is referrible to chemical rather than to mechanical causes; and he refers it to some peculiar secretion which the animal forms, and which readily destroys carbonate of lime, whilst siliceous and argillaceous stones resist its action. In conclusion Mr. Osler remarks, that he has made many experiments with a view to detect the nature of the solvent: he shows that it is not of an acid nature; nor has he been able to detect any peculiar soluble compound of lime in portions of water, in which many Saxicavæ had been confined, together with a portion of calcareous rock; yet though such direct proofs are wanting, he considers the collateral evidence as quite satisfactory in proving that a true solvent power over calcareous matter is exerted by those animals.

### *An Account of some Experiments relative to the Passage of radiant Heat through glass Screens. By the Rev.* Baden Powell, *M.A. F.R.S. of Oriel College, Oxford. Communicated March* 9, 1826. Read June 1, 1826. [*Phil. Trans.* 1826, *p.* 372.]

The object of this paper is to examine the correctness and the consequences of a conclusion of De la Roche, that if radiant heat be intercepted by two transparent screens, the additional diminution of effect occasioned by the second is proportionally much less than that produced by the first, and so for any number of screens. This M. De la Roche explains by supposing the heat passing through the first screens to acquire thereby a kind of polarization, which enables it to pass the rest more easily. The author, however, observes, that when the temperature of the source of heat is above incandescence, the fact admits of more simple explanation, by regarding the heat as consisting of two portions, the one incapable of penetrating glass, and therefore wholly stopped by the first screen; the other capable of so doing, and therefore readily transmitted through any number of screens.

If, however, he observes, the same effect is produced at temperatures below luminosity, this explanation fails; and either De la Roche's idea of polarization, or some other, must be resorted to; and it is to the examination of this case that the experiments detailed in his paper are devoted.

His apparatus consisted of two tin reflectors, opposed to each other, and having in the focus of one a blackened thermometer, and in that of the other an iron ball heated to redness, and cooled till it ceased to be visible in the dark. The indications of the thermometer were observed; first, for the direct effect; secondly, with one glass screen interposed; thirdly, with two;—sometimes a mercurial, sometimes an air thermometer was used. The indications were noted after each half minute of exposure, till the thermometer ceased to rise. The temperatures acquired by the screens were also noted. The conclusions drawn by the author from a great number of such experiments are,—

First, That the fact observed by M. De la Roche is verified when the source of heat is below luminosity, as well as above it. For in all the trials a rise was observed to take place in the focal thermometer, much smaller with one than with no screen, and very small indeed with two. The diminution, however, occasioned by the second screen was proportionally much less than that occasioned by the first.

On analysing more minutely, however, the progress of the rise of the temperature from half minute to half minute, and comparing it, in the cases where screens were used, with the observed progressive